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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,439	03/23/2004	Noritaka Takahata	VX042605	1796

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EXAMINER

ALEXANDER, MICHAEL P

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,439

Applicant(s)

TAKAHATA ET AL.

Examiner

Michael P. Alexander

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim(s) 1-8 is/are pending.

Claim Objections

Claim 1 is objected to because of the following informalities: "eutectoid" in line 6 should be "eutectic". Appropriate correction is required. The Examiner suggests that applicant provide a translation of at least a portion of the foreign priority documents as evidence that this was merely an error in translation and to avoid a rejection based on 35 USC 112, first paragraph.

Specification

The disclosure is objected to because of the following informalities: "Wolfram" in line 3 of page 7 should be "Tungsten". Appropriate correction is required.

The Examiner the term "eutectoid" throughout the specification should be "eutectic". The Examiner suggests that applicant provide a translation of at least a portion of the foreign priority documents as evidence that this was merely an error in translation and to avoid introducing new matter.

Claim Interpretations

The Examiner will examine the claims based on the interpretation that the term "eutectoid" is instead "eutectic".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris et al. (US 2003/0091459 A1).

Regarding claim(s) 1, Harris teaches (abstract, 0002, 0030):

"A nickel-base superalloy that is useful for making single crystal castings exhibiting outstanding stress-rupture properties, creep-rupture properties, and an increased tolerance for grain defects contains, in percentages by weight, from about 4.7% to about 4.9% chromium, (Cr), from about 9% to about 10% cobalt (Co), from about 0.6% to about 0.8% molybdenum (Mo), from about 8.4% to about 8.8% tungsten (W), from about 4.3% to about 4.8% tantalum (Ta), from about 0.6% to about 0.8% titanium (Ti), from about 5.6% to about 5.8% aluminum (Al), from about 2.8% to about 3.1% rhenium (Re), from about 1.1% to about 1.5% hafnium (Hf), from about 0.06% to about 0.08% carbon (C), from about 0.012% to about 0.020% boron (B), from about 0.004% to about 0.010% zirconium (Zr), the balance being nickel and incidental impurities. The nickel-base superalloy provides improved casting yield and reduce component cost due to a reduction in rejectable grain defects as compared with conventional directionally solidified casting alloys and conventional single crystal alloys."

"The superalloys of this invention may contain trace or trivial amounts of other constituents which do not materially affect their basic and novel characteristics. It is desirable that the following compositional limits are observed: niobium (Nb, also known as columbium) should not exceed 0.10%, vanadium (V) should not exceed 0.05%, sulfur (S) should not exceed 5 ppm, nitrogen (N) should not exceed 5 ppm, oxygen (O) should not exceed 5 ppm, silicon (Si) should not exceed 0.04%, manganese (Mn) should not exceed 0.02%, iron (Fe) should not exceed 0.15%, magnesium (Mg) should not exceed 80 ppm,

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lanthanum (La) should not exceed 50 ppm, yttrium (Y) should not exceed 50 ppm, cerium (Ce) should not exceed 50 ppm, lead (Pb) should not exceed 1 ppm, silver (Ag) should not exceed 1 ppm, bismuth (Bi) should not exceed 0.2 ppm, selenium (Se) should not exceed 0.5 ppm, tellurium (Te) should not exceed 0.2 ppm, Thallium (Tl) should not exceed 0.2 ppm, tin (Sn) should not exceed 10 ppm, antimony (Sb) should not exceed 2 ppm, zinc (Zn) should not exceed 5 ppm, mercury (Hg) should not exceed 2 ppm, uranium (U) should not exceed 2 ppm, thorium (Th) should not exceed 2 ppm, cadmium (Cd) should not exceed 0.2 ppm, germanium (Ge) should not exceed 1 ppm, gold (Au) should not exceed 0.5 ppm, indium (In) should not exceed 0.2 ppm, sodium (Na) should not exceed 10 ppm, potassium (K) should not exceed 5 ppm, calcium (Ca) should not exceed 50 ppm, platinum (Pt) should not exceed 0.08%, and palladium (Pd) should not exceed 0.05%."

"This invention relates to superalloys exhibiting **superior high temperature mechanical properties**, and more particularly to superalloys useful for casting single crystal turbine vanes including vane segments."

With respect to the recitation "consists essentially of" in claim 1, it is the applicant's burden to establish that the amount of Mo, Re and Hf included in the alloy of Harris is excluded from his claims by consisting essentially of language. See MPEP 2111.03.

With respect to the compositional formula that Al + Ti + Ta, by atomic percent, amounts to 12.0-15.5 in claim 1, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art. In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177., 57 USPQ 1 17, Taklatwalla v. Marburg, 620 O.G. 685, 1949 C.D. 77, and In re Pilling, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those ordinary skilled in the art. In re Austin, et al. 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select alloy compositions fulfilling the claimed

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compositional relationships from the alloy compositional ranges disclosed by Harris because Harris teaches the same utility throughout the disclosed compositional ranges.

With respect to the compositional formula that the "M-value" defined by the claim formula in claim 1 is in the range of 93-98 in claim 1, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, *In re Cooper and Foley* 1943 C.D. 357, 553 O.G. 177., 57 USPQ 1 17, *Taklatwalla v. Marburg*, 620 O.G. 685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those ordinary skilled in the art. *In re Austin, et al.* 149 USPQ 685, 688. It would have been obvious to one of ordinary skill in the art to select alloy compositions fulfilling the claimed compositional relationships from the alloy compositional ranges disclosed by Harris because Harris teaches the same utility throughout the disclosed compositional ranges.

With respect to the limitation that the alloy contain gamma / gamma prime eutectic of, by area percentage, 1-15% in claim 1, Harris teaches (0043) that the alloy would have about 5% volume fraction (which is the same as area percentage) eutectic phase.

With respect to the limitation that the alloy contain carbides of, by area percentage, 1-10% in claim 1, the Examiner asserts that the alloy would inherently contained the claimed amount of carbides because the alloy contains 0.06 to 0.08% C.

Regarding claims 2-4, Harris teaches (abstract, 0030):

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A nickel-base superalloy that is useful for making single crystal castings exhibiting outstanding stress-rupture properties, creep-rupture properties, and an increased tolerance for grain defects contains, in percentages by weight, from about 4.7% to about 4.9% chromium (Cr), from about 9% to about 10% cobalt (Co), **from about 0.6% to about 0.8% molybdenum (Mo)**, from about 8.4% to about 8.8% tungsten (W), from about 4.3% to about 4.8% tantalum (Ta), from about 0.6% to about 0.8% titanium (Ti), from about 5.6% to about 5.8% aluminum (Al), from about 2.8% to about 3.1% rhenium (Re), from about 1.1% to about 1.5% hafnium (Hf), from about 0.06% to about 0.08% carbon (C), from about 0.012% to about 0.020% boron (B), from about 0.004% to about 0.010% zirconium (Zr), the balance being nickel and incidental impurities. The nickel-base superalloy provides improved casting yield and reduce component cost due to a reduction in rejectable grain defects as compared with conventional directionally solidified casting alloys and conventional single crystal alloys.

"The superalloys of this invention may contain trace or trivial amounts of other constituents which do not materially affect their basic and novel characteristics. It is desirable that the following compositional limits are observed: niobium (Nb, also known as columbium) should not exceed 0.10%, **vanadium (V) should not exceed 0.05%, sulfur (S) should not exceed 5 ppm,** nitrogen (N) should not exceed 5 ppm, oxygen (O) should not exceed 5 ppm, silicon (Si) should not exceed 0.04%, manganese (Mn) should not exceed 0.02%, **iron (Fe) should not exceed 0.15%, magnesium (Mg) should not exceed 80 ppm,** lanthanum (La) should not exceed 50 ppm, yttrium (Y) should not exceed 50 ppm, cerium (Ce) should not exceed 50 ppm, lead (Pb) should not exceed 1 ppm, silver (Ag) should not exceed 1 ppm, bismuth (Bi) should not exceed 0.2 ppm, selenium (Se) should not exceed 0.5 ppm, tellurium (Te) should not exceed 0.2 ppm, Thallium (Tl) should not exceed 0.2 ppm, tin (Sn) should not exceed 10 ppm, antimony (Sb) should not exceed 2 ppm, zinc (Zn) should not exceed 5 ppm, mercury (Hg) should not exceed 2 ppm, uranium (U) should not exceed 2 ppm, thorium (Th) should not exceed 2 ppm, cadmium (Cd) should not exceed 0.2 ppm, germanium (Ge) should not exceed 1 ppm, gold (Au) should not exceed 0.5 ppm, indium (In) should not exceed 0.2 ppm, sodium (Na) should not exceed 10 ppm, potassium (K) should not exceed 5 ppm, **calcium (Ca) should not exceed 50 ppm,** platinum (Pt) should not exceed 0.08%, and palladium (Pd) should not exceed 0.05%."

With respect to the limitation that the impurity level of Cu be regulated up to 0.3% in claim 3, Harris do not specify that it is necessary that the alloy contain any Cu.

Therefore, the alloy of Harris would inherently meet this limitation.

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Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris et al. as applied to claims 1-4 above, and further in view of the admitted prior art (see lines 16-20 in the background section of the specification of the instant application).

Regarding claims 5-8, the applicant admits (see lines 16-20 in the background section of the specification of the instant application) that turbine wheels for automobile engines require heat resistant property and enough strength at high temperatures. Harris teaches (0001) that the alloy would have superior high temperature mechanical properties. It would have been obvious to one of ordinary skill in the art to combine the alloy of Harris with the turbine wheel of the admitted prior art because the alloy of Harris has superior high temperature mechanical properties.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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